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SOVIET BLOC INTERNATIONAL GEOPHYSICAL YEAR INFORMATION

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PLEASE NOTE

By decision of the Fifth CSAGI Assembly held in Moscow, 30 July-9 August 1958, the extension of investigations conducted under the IGY program from July 1957 to December 1958 is called International Geophysical Cooperation -- 1959. Therefore, beginning with this issue, the title of this publication is changed to INFORMATION ON SOVIET BLOC INTERNATIONAL GEOPHYSICAL COOPERATION.

This report presents unevaluated information on Soviet Bloc activities selected from foreign-language publications as indicated in parentheses. It is published as an aid to United States Government research.

INFORMATION ON SOVIET BLOC INTERNATIONAL GEOPHYSICAL COOPERATION

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I. GENERAL

IGY Program Continues Under the Name of International Geophysical Cooperation-1959

The extension of investigations conducted under the program of the International Geophysical Year will be continued during 1959 as a result of the unanimous decision of the Fifth CSAGI Assembly held in Moscow, 30 July-9 August 1958. This additional year of joint investigations will be known as International Geophysical Cooperation -- 1959.

The 18 months of the IGY just completed on 31 December are hailed by B. Belousov, Corresponding Member of the Academy of Sciences USSR, as an outstanding example of international scientific cooperation. The program established during the IGY, the conditions for the exchange of materials, the central coordinating organizations, etc., will be retained in the coming year.

Belousov gives the following information on Soviet plans for IGC-1959.

The Soviet Committee for the Conduct of the International Geophysical Year supported a plan according to which the scientists of 100 scientific establishments and higher educational institutions in the Soviet Union will continue observations of the processes originating in the Earth, in the oceans, and in the atmosphere during 1959.

In 1959, the scope of research work according to the IGY program will not be smaller than in the preceeding year. About 500 stations and observatories in the territory of the Soviet Union will continue their own observations on meteorological and magnetic phenomena, on cosmic rays, ionospheric disturbances, solar activity, the aurorae, and on other geophysical phenomena, according to all disciplines of the IGY program. The Soviet Antarctic Expedition will continue its own activity, and will organize a new station, "Lazarev," in the yet unstudied part of the Antarctic shore. Ten research ships will ensure the further development of oceanographic work during which new means of underwater observations will be used.

Soviet scientists continuing the observations in 1959 will devote more attention to the processing and scientific analysis of the collected materials.

The processing of materials will naturally continue for several years. The results of the processing conducted by Soviet researchers will be published for general use in a special series, Trudy MGG (Works of the IGY), and also in the international publication, Annals of the IGY.

"Before us," says the writer, stands the problem of maintaining a network of geophysical stations and observatories and other forms of geophysical investigations in the future on a level commensurate with the attained successes and with the ever-growing value of geophysics for various facets of mans' life and activity.

"This progress, which is the result of forces united with the organization of the IGY, must be strengthened in the future. Soviet geophysicists have always stood for the development and strengthening of scientific ties with their foreign colleagues. During the IGY, Soviet scientists contributed in many ways to the establishment of good, friendly conditions among the participants of this grandiose enterprise.

"Soviet scientists will also henceforth do all in their power for the further expansion and deepening of international cocperation." ("A Good Example of International Scientific Cooperation," by V. Belousov, Corresponding Member of the Academy of Sciences, USSR; Moscow, Pravda, 29 Dec 59, p 6)

II. ROCKETS AND ARTIFICIAL EARTH SATELLITES

Soviets Launch Rocket Toward Moon

The following is a complete translation of the Tass report which appeared in 3 January Pravda, revealing the launching of a Soviet cosmic rocket toward the Moon.

"The years 1957-1958 were marked by the greatest achievements of the Soviet Union in the field of rocket building. The launchings of the Soviet artificial earth satellites made it possible to gather the necessary material for the realization of cosmic flights and the eventual flight to other planets of the solar system. The scientific research and experimental design work conducted in the USSR was directed toward the creation of large artificial earth satellites in size and weight. The weight of the third Soviet artificial satellite, as is known, was of 1,327 kilograms.

"With the successful launching on 4 October 1957 of the first artificial earth satellite and the succeeding launchings of the ponderous Soviet satellites according to the program of the International Geophysical Year, the first cosmic velocity of 8 kilometers per second was attained.

"Now, as a result of the further creative labors of Soviet scientists, designers, engineers, and workers, a multistage rocket was built whose last stage was capable of achieving the secondary cosmic velocity of 11.2 kilometers per second, guaranteeing the possibility of interplanetary flight.

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"On 2 January 1959, the launching of a cosmic rocket toward the Moon was achieved in the USSR. The multistage cosmic rocket entered a trajectory in the direction of the Moon according to a given program. According to preliminary data, the last stage of the rocket attained the necessary secondary cosmic velocity. Continuing its flight, the rocket crossed the eastern border of the Soviet Union, passed over the Hawaiian Islands, and is continuing over the Pacific Ocean, rapidly moving away from the Earth.

"At 0310 Moscow time on 3 January, the cosmic rocket, moving in the direction of the Moon, will pass over the southern part of the island of Sumatra and will be at a distance of 110 kilometers from the Earth. According to preliminary calculations, which were made more accurate by direct observations, the cosmic rocket will reach the region of the Moon at 0700 hours on 4 January 1959.

"The last stage of the cosmic rocket, with a weight of 1,472 kilograms less fuel, was equipped with a special container inside of which is measuring apparatus for conducting the following scientific investigations: detection of the magnetic field of the Moon; studying the intensity of and variations of the intensity of cosmic rays outside the Earth's magnetic field; the registration of photons in cosmic radiation; detection of the Moon's radioactivity; the study of the distribution of heavy nuclei in cosmic radiation; the study of the gaseous components of interplanetary matter; the study of the Sun's corpuscular radiation; and the study of meteor particles.

"For observations during the flight of its last stage, the cosmic rocket carried a radio transmitter sending telegraph messages with a duration of 0.8 and 1.6 seconds on two frequencies, 19.997 and 19.995 megacycles; a radio transmitter operating on a frequency of 19.993 megacycles, sending telegraph messages of variable duration of about 0.5-0.9 seconds, by which the data of the scientific observations are transmitted; a radio transmitter sending on a frequency of 183.6 megacycles and used for measuring the parameters of the motion and the transmission of scientific information to Earth; and a special apparatus intended for the creation of a sodium cloud, that is, an artificial comet.

"The artificial comet can be observed and photographed by optical instruments equipped with light filters separating the spectral sodium line.

"The artificial comet will be formed on 3 January at approximately 0357 Moscow Time and will be visible for about 2-5 minutes in the constellation of Virgo, approximately in the center of a triangle formed by the stars alpha of Bootes, alpha of Virgo and alpha of Libra.

"The cosmic rocket carries on board pennants with the emblem of the Soviet Union and the inscription: 'Union of Soviet Socialist Republics, January 1959.'

"The total weight of the scientific and measuring apparatus along with the power source and container is 361.3 kilograms.

"Scientific tracking stations located in different regions of the Soviet Union are conducting observations of the first interplanetary flight.

"The determination of the elements of the trajectory is done with electronic computers according to measurement data automatically arriving at the coordination-calculation center.

"Processing the results of the measurements makes it possible to obtain data concerning the motion of the cosmic rocket and to determine that part of interplanetary space in which the scientific observations are being made.

"The creative labor of all the Soviet people, directed to the solution of the most important problems for the development of a socialistic society in the interests of all progressive mankind made it possible to realize the first successful interplanetary flight.

"The launching of the Soviet cosmic rocket once again indicates the high level of the development of Soviet rocket building and again demonstrates to the whole world the outstanding achievement of advanced Soviet science and engineering.

"The greatest secrets of the universe have become more accessible to man, who, in the not-too-distant future, will be able to tread the surface of other planets.

"The staffs of the scientific research institutes, design bureaus, plants, and experimental organizations dedicated this launching to the 21st Congress of the Communist Party of the Soviet Union.

"The transmission of data concerning the flight of the cosmic rocket will be made regularly by all the radio stations of the Soviet Union."

("The Launching of a Cosmic Rocket Toward the Moon"; Tass report; Moscow, Pravda, 3 Jan 59, p 1)

Future Use of Satellites in Astronomy

A New Year's Day article by Prof B. Kukarkin, vice-president of the International Astronomical Union presents some future prospects for astronomy.

For the first time in its several thousand years of existence, astronomy was changed from a purely observational science into an experimental science, with the advent of the artificial earth satellites.

Observations beyond the atmosphere of the radiation of celestial bodies and the registration of cosmic rays with artificial satellites opened unprecedented prospects. Interesting data on cosmic rays has already been obtained, but this is only the beginning. For the present, systematic observations of celestial bodies are still hindered by the tumbling of artificial satellites around their own axes. However, successful experiments with rockets equipped with special apparatus stabilizing their position in space, are evidence that in the not-too-distant future, it will be possible to conduct systematic astronomical observations with artificial earth satellites.

Artificial satellites and other cosmic craft will play a very important role in the study of the structure and development of matter as a whole and of nuclear processes in particular.

The study of outbursts on the Sun (which cause substantial changes in the ionosphere) with artificial earth satellites in the ultra violet, X-ray, and firm range of frequencies opens new possibilities in understanding and in perhaps reproducing these processes.

In the so-called nonsteady-state stars phenomena similar to the eruptions on the Sun are observed on a scale billions of times more powerful than on the Sun. In these stars, grandiose processes occur which lead to the almost instantaneous release of enormous quantities of energy. At present, nothing certain is known of the nature of similar phenomena. An understanding of these processes is of great practical interest. The time is not far off when cosmic craft will be able to approach these stars and study the processes developing there.

It is impossible to enumerate all the problems which will be opened before man in connection with the beginning of direct studies of cosmic space and celestial bodies with the aid of artificial earth satellites. There will be many of these satellites, says Kukarkin, among them permanent Earth satellites. ("New Year Sky," by Prof B. Kukarkin, vice-president, International Astronomical Society; Moscow, Pravda, 1 Jan 59, p 4)

III. UPPER ATMOSPHERE

New Book on Aurorae

A new book on aurorae, Polyarnyye Siyaniya (Aurorae), by S. I. Isoyev and N. V. Pushkov, Popular Science Series, Moscow, 1958, 114 pages with illustrations and seven enclosures, 3 rubles 25 kopeks, was recently published.

The book presents a modern theory on the aurorae, a description of the natural phenomena, their classification, an analysis of their connection with magnetic storms and solar activity, and the characteristic methods of studying aurorae. ("New Books; Short Annotation of Publications of the Academy of Sciences USSR"; Moscow, Vestnik Akademii Nauk SSSR, No 11, Nov 58, p 136)

IV. METEOROLOGY

New Book on Atmospheric Humidification

A new book by N. N. Ivanov, Atmosfernoye Uvlazhneniye Tropicheskikh i Sopredel'nykh Stran Zemnogo Shara (Atmospheric Humidification of the Earth's Tropic and Adjacent Countries), Notes of the Geographic Society USSR, Vol 18, New Series, M.-L., 1958, 312 pages with illustrations and 14 enclosures, 1700 copies, 23 rubles 75 kopeks, was recently published.

The book presents an investigation of the annual variation and the quantitive side of the atmospheric humidification of localities, the duration of the periods of the various degrees of humidification, and other problems. The book contains 14 maps and more than 300 graphics of the range of annual humidifying variation. ("New Books; Short Annotation of Publications of the Academy of Sciences USSR"; Moscow, Vestnik Akademii Nauk SSSR, No 11, Nov 58, p 136)

V. SEISMOLOGY

"Artificial Earthquakes" Used in Seismic Research in USSR

An article in a recent issue of a Soviet popular science magazine touches briefly on Soviet seismic research based on "artificial earthquakes."

Oscillations radiated by the earthquake shocks are frequently difficult to decipher. To create clearly expressed forms of this natural phenomenon, explosions were used for the first time in the Soviet Union for scientific aims.

One such explosion, of great force, was set off in December 1957 at a distance of 100 kilometers from Tashkent. Observations of this explosion were conducted by more then 50 Middle Asian seismic stations. With the aid of this explosion, the depths of the Earth's crust were explored in a territory extending approximately from Stalinabad to Alma-Ata.

At present, the article continues, scientists have decided to use "earthquakes" of comparatively small force which can be realized considerably easier and more frequently. Such "small" artificial earthquakes are used now in studying the territory of Middle Asia and the ice strata of the Fedchenko Glacier. New highly sensitive apparatus have been built for this work. ("Artificial Earthquakes"; Moscow, Nauka i Zhizn', No 12, Dec 58, p 70)

Formulas for Calculating Absorption Coefficient of Elastic Waves in Rock

Certain analytical dependencies which make it possible to calculate the coefficient of absorption of the energy of an elastic impulse according to the change in the observed values of the amplitudes of the soil displacement velocity are discussed in an article by V. V. Kravets, Institute of Geological Sciences, Academy of Sciences Ukranian SSR.

Application of the derived formulas to the analysis of seismograms which were obtained while conducting high-frequency seismic surveys yielded good results. ("Certain Formulas for Calculating the Amplitude Coefficient of Absorption of Refracted Waves in Crystalline Rocks," by V. V. Kravets, Institute of Geological Sciences, Academy of Sciences Ukranian RSR; Kiev, Dopovidi Akademii Nauk Ukrains'koy RSR, No 11, 1958, pp 1225-1229)

VI. ARCTIC AND ANTARCTIC

Severnyy Polyus-7 Ice Floe Splits

A 5-meter-wide crack has split the ice floe which carries the drift station Severnyy Polyus-7 in the Arctic.

According to a report from the Main Administration of the Northern Sea Route, the station is now in the Western Hemisphere at a point located at 86-21 N latitude and 96-37 E longitude [sic; probably should be W longitude], a little more than 400 kilometers from the North Pole.

According to the latest report received from Nikolay Belov, chief of station Severnyy Polyus-7, the hydrologists' huts and the helicopter shed have been moved away from the edge into the interior portion of the ice floe. Contact is being made with the ionospherists, who are now on the other half of the ice floe.

At the beginning of its drift, Severnyy Polyus-7 was at 82-04 N latitude and 164-50 W longitude. ("SP-7 Splits Up"; Rome, L'Unita, 24 Dec 58)

Flights in Antarctica

The airplane piloted by Viktor Perov, after accomplishing the rescue of the Belgian polar workers whose plane had crashed, returned safely to Mirnyy on 19 December at 0225 hours Moscow time.

On 19 December, at 0445 hours Moscow time, the LI-2 plane piloted by Nikolay Shkol'nikov successfully completed its flight from Mirnyy to the Pole of Inaccessibility and back to Mirnyy. On 18 December, at 1515 hours, the plane had made a ski landing at this pole. This was the first time in history a plane had landed at this spot. The Soviet continental sled-tractor expedition had raised the USSR state flag at this location on 14 December and had established the seventh Soviet scientific station in Antarctica.

The route of the flight covered 4,400 kilometers and passed over the stations Pionerskaya, Komsomol'skaya, and Sovetskaya, situated on the high-mountain ice plateau. Despite the antarctic summer, the temperature in these regions dropped to minus 30 degrees Centigrade on 19 December. ("In Antarctica"; Moscow, Izvestiya, 20 Dec 58)

Sled-Tractor Train Returns From Antarctic Interior

According to a report from Mirnyy, the sled-tractor train headed by the Leningrad engineer G. Burkhanov returned to Mirnyy on 27 December 1958, after a long expedition into the region of the south geomagnetic pole.

The train delivered to the station Vostok about 30 tons of food, fuel, and other expeditionary freight necessary for the work of the Fourth Antarctic Expedition during 1959.

The interior expedition took 3 months. The members of the party traveled about 3,000 kilometers across the antarctic ice plateau at an altitude of up to 3,500 meters under difficult snow conditions. The temperature dropped to minus 60 degrees Centigrade and even lower.

The continental Soviet expedition was supported by planes of the aerial detachment under pilot V. Perov. ("Three Thousand Kilometers Across the Ice Plateau"; Moscow, Izvestiya, 28 Dec 58)

Second Expeditionary Ship Leaves for Antarctic

On 20 December, the loading of the Soviet diesel ship Mikhail Kalinin in Riga port was completed. This new ship was built in the GDR according to Soviet specifications. The Mikhail Kalinin will transport the remaining 55 members of the Fourth Antarctic Expedition to the coast of Antarctica.

On its way, the ship will stop at the Polish port of Gdynia to take aboard a group of Polish scientists who are going to winter at the station Oazis, recently transferred to the Polish Republic by the Soviet government.

The ship is scheduled to leave Riga on 21 December and is expected to reach Antarctica at the height of the Antarctic summer. ("To the Shores of Antarctica"; Moscow, Pravda, 21 Dec 58)

The Ob' Is Approaching Antarctica

More than a month has passed since the Ob' left on its Antarctic voyage. The ship is now in the "50" latitudes, having left the equatorial waters of the Atlantic and the South African port of Capetown.

During their voyage to the Antarctic, the scientific groups of the expedition are conducting a large number of observations. The geophysicists began their work immediately after the ship sailed. The aerometeorological detachment is conducting regular observations in aerology, meteorology, actinometry,, and other fields. The hydrological detachment, headed by V. Kh. Buynitskiy, participant in the heroic drift on the icebreaker Georgiy Sedov, began its work as soon as the Ob' left the English Channel. The oceanological, hydrographic, hydrochemical, and hydrobiological groups, and the group of marine geology, have collected data of great scientific and practical interest.

The temperature of the air and water are gradually getting lower, and icebergs are encountered more frequently along the route of the ship. ("Approaching the Sixth Continent"; Moscow, Izvestiya, 30 Dec 58)

Arctic and Antarctic Exchange New Year's Greetings

Soviet polar workers at the drift station Severnyy Polyus-6 in the Arctic and at the station Vostok in the Antarctic had a radiotelegraphic conversation on New Year's Eve, exchanging New Year's greetings and information on the current situation at their respective stations. The conversation was held by S. T. Serlapov at Severnyy Polyus-6, and V. S. Sidorov, at the station Vostok.

Severnyy Polyus-6 is now drifting 330 kilometers from the geographic North Pole. The ice of the ice floe is about 10 meters thick, and the ocean depth is more than 4,000 meters. Information regarding the Central Arctic has been supplemented by many new data. For the first time in these latitudes, men equipped with diving suits have descended below the ice during the arctic winter. Recently, Viktor Gavrilovich Savin descended underwater to a depth of 20 meters. There he installed an automatic apparatus for investigating the subglacial layer of water.

The station Vostok reported that the transantarctic expeditions of Soviet scientists who conducted seismic soundings of the ice thickness have finally provided an answer to the question whether Antarctica is a continent or an archipelago. It has been determined that Antarctica is, in effect, a continent. ("At Two Poles;" Moscow, Pravda, 1 Jan 59)

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